UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

January 30, 2012

MEMORANDUM

SUBJECT: CSTAG Recommendations on the Gowanus Canal Superfund Site

FROM: Stephen J. Ells, Chair *Stephen J. Ells*
Contaminated Sediments Technical Advisory Group (CSTAG)

TO: Christos Tsiamis, Remedial Project Manager, Region 2

Background

OSWER Directive 9285.6-08, *Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites* (Feb. 12, 2002), established the Contaminated Sediments Technical Advisory Group (CSTAG) as a technical advisory group to" monitor the progress of and provide advice regarding a small number of large, complex, or controversial contaminated sediment Superfund sites." The main purpose of the CSTAG is to help Regional site project managers of selected sites appropriately manage their sites throughout the Superfund process in accordance with the 11 risk management principles set forth in the OSWER Directive and with the recommendations in the 2005 *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites*. CSTAG membership consists of one representative per Region, two from the Office of Research and Development, two from the U.S. Army Corps of Engineers' Engineer Research Development Center, and two from the Office of Superfund Remediation and Technology Innovation.

Brief Description of the Site

The Gowanus Canal is a 1.8-mile-long, 100 foot wide man-made canal in the Brooklyn Borough of New York City, in Kings County, New York. The canal was built in the 1860s by bulkheading and dredging a tidal creek and surrounding lowland marshes. Following construction, the canal quickly became one of the nation's busiest industrial waterways, servicing heavy industries that included manufactured-gas plants (MGPs), coal yards, cement manufacturers, tanneries, paint and ink factories, machine shops, chemical plants, and oil refineries. It was also the repository of untreated industrial wastes, raw sewage, and surface water runoff for decades, causing it to become one of New York's most polluted waterways. A lot of the canal has filled in; the sediment depth is typically about 12 feet. The water depth varies from zero at the top (*i.e.,* the north end) of the canal during low tide to greater than 30 feet in the lower sections, and the tidal range is about five feet. Although the level of industrial activity along the canal has declined over the years, high levels of contamination remain in the sediments and there are significant continuing releases of hazardous substances and bio-solids into the canal. Currently there are over 200 non-permitted discharge pipes, ten combined sewer outfalls

(CSOs), three storm water outfalls and five other permitted discharges that may be contaminant sources.

On March 2, 2010, USEPA placed the Gowanus Canal (USEPA ID#: NY000206222) on its National Priorities List of hazardous waste sites requiring further evaluation. The Region completed the Remedial Investigation (RI) in January 2011 and the Feasibility Study (FS) in December, 2011. A Proposed Plan and Record of Decision (ROD) are planned for 2012.

The CSTAG visited the site and met with the site team from November 2 to 4, 2011. Several of the invited stakeholders made presentations to the CSTAG. The presenters represented the City of New York, National Grid, the National Oceanic and Atmospheric Administration (NOAA), the Friends and Residents of the Greater Gowanus, the Cobble Hill Association, the Gowanus Neighborhood Association, the Brooklyn Chapter of the Sierra Club, and the Coalition for Respectful Development.

CSTAG Recommendations

Based upon our site visit, our review of the site information provided to us, and the presentations made by the stakeholders, the CSTAG offers the following site-specific recommendations in order to more fully address the recommendations in the 2005 *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites*, and other relevant EPA guidance and policies appropriate for sediment sites. The CSTAG expects that the site team will consider these recommendations as the investigations continue, as the conceptual site model is refined, as remedial alternatives are developed and evaluated, and as the preferred remedy is proposed. The Remedial Project Manager should send a written response to each of these recommendations to the CSTAG chair within 60 days.

General Recommendations

1 - The CSTAG recommends that the Region work actively with all parties to encourage and coordinate the timely completion of the various source control and cleanup activities that are to be conducted by different parties. To facilitate public understanding of the entire scope of the Gowanus Canal cleanup process, the decision document should summarize any agreements for coordinating source control and cleanups. The summary should describe the scope of the action, the timing, the law or regulation being used and the party (*e.g.*, New York City, New York State, National Grid, EPA Superfund or EPA Water) responsible for conducting (and overseeing where appropriate) these activities. This will help facilitate the overall timeliness and long-term effectiveness of all current and future cleanups and lead to environmental recovery of the canal. Examples of such activities needing coordination include:

- the MGP cleanups,
- the remediation of contaminated sediments,
- the replacement of bulkheads,
- the updating and modification of the flushing tunnel,
- the City's plan to update and modify the CSOs,
- the City's plan to dredge the top 750 yd of the canal to make sure bio-solids are not exposed at low tide, and.
- the elimination of significant releases from the 200+ non permitted discharge pipes.

2 - Based upon the information provided to the CSTAG, current and historical site-related releases of Polycyclic Aromatic Hydrocarbons (PAHs) from the MGPs into the canal pose a risk to human health and the environment. In many locations, Non Aqueous Phase Liquids (NAPLs) and coal tar deposits in the sediment bed continue to act as significant sources of PAHs to the surface sediment, sediment pore water and the surface water. In many areas, this contamination is present in the layer of native sediment six or more feet below the bottom of the more recently deposited contaminated sediments. Some of these NAPL deposits are very large and contain very high concentrations of PAHs; the average concentration in sub-surface sediments is 3500 mg/kg vs. 530 mg/kg for the surface sediments. The planned response actions for the three MGP sites should significantly reduce the release of PAHs to the sediment, groundwater and surface water from these upland areas.

The CSTAG strongly recommends that the Region consider focusing this response action on remediating those sediment areas containing NAPL and coal tar deposits rather than having the response action address all of the contaminant-related risks in the canal. The CSTAG recognizes that there are long-term plans to reduce releases from the lateral inputs and from the major CSOs, but believes it may be many years if not decades before contaminant releases are reduced to levels that would not present unacceptable risks to human health and the environment. Of specific concern are releases of copper, PCBs, and PAHs from the outfalls and discharge pipes and the non-point releases of PAHs typical of heavily developed urban areas bordering the canal.

Based upon existing data, it is not currently possible to accurately predict the levels of potential recontamination after the initial CERCLA action, or the future level of contamination and risk reduction that will be achieved after completion of all planned source control activities. However, the CSTAG anticipates there would be significant recontamination of the surface sediment after any sediment remedy is implemented before the needed source control actions for other releases are completed. Therefore, the CSTAG recommends that the Region consider an interim source control action that addresses the buried NAPLs and coal tar deposits. The final remedy for the Gowanus Canal sediments could be implemented after additional source control activities have been implemented and their effects on improving sediment and water quality are better understood.

If the Region considers taking a source control action to cap the NAPLs in the deeper sediments, the CSTAG recommends that the Region also evaluate the likelihood that a capping alternative will adequately contain the ongoing releases of contaminants and NAPL from the MGPs and prevent contamination of the sediment and surface water above the cap. If the Region is not confident that capping will adequately contain these sources, it may be necessary to postpone this action until sufficient cleanup of the MGP sites has occurred.

Principle-Specific Recommendations

3. Control Sources Early (Principle 1).

As discussed earlier, the CSTAG is concerned about recontamination following any remedial action that is undertaken before sources are controlled. There are unpermitted pipe discharges and loadings from the CSOs which may increase due to new planned residential developments. We recommend that the Region work with the appropriate regulatory authority to develop a plan to expeditiously eliminate

unpermitted, piped discharges that may be responsible for significant contaminant loading to the canal. The EPA decision documents should summarize how the City plans to address the CSOs, including the expected reductions in CSO discharges and potential degree of recontamination of sediments by the CSOs following a remedy.

4. Involve the Community Early and Often (Principle 2).

The CSTAG recommends that the Region clearly communicate to the local communities and other stakeholders what the Superfund remediation can and cannot be expected to achieve at this site. EPA's authority under CERCLA is limited to addressing specific hazardous substances, pollutants, and contaminants (*i.e.,* a Superfund sediment remedy will typically not address pathogens). The Region needs to clearly describe realistic expectations for risk-reduction, future conditions, and uses of the waterbody following remediation. Furthermore, it needs to be understood by the community that as long as the CSOs continue to discharge (even at the reduced rate once the current upgrades are completed), one should expect some level of continued ecological risks from copper and PAHs, and potential human health risks from PCBs. The CSTAG is concerned that the excellent working relationship that has been built between EPA and the local communities will suffer without such transparency. The following steps are recommended:

- Translate the materials into Spanish for the Red Hook Community and consider holding a meeting to further engage this community,
- Discuss the timing of any CERCLA sediment cleanup in relation to the timing of the other planned non-CERCLA cleanups that may take much longer to implement,
- Although it is very uncertain, discuss the level of human health and ecological risk reduction that may be achieved after various sediment cleanup alternatives. This would reflect the level of risks from fish consumption and direct contact that may remain until the other non-Superfund source control and cleanup actions have been completed, and
- Work with all stakeholders to establish what the future uses of the waterbody are expected to be in the near and long-term. This includes acceptable recreational uses and identifying the areas where navigational depths need to be maintained to allow specified types of barges and tugs needed by existing commercial entities.

5. Coordinate with States, Local Governments, Tribes, and Natural Resource Trustees (Principle 3).

The CSTAG recommends increasing its communication and coordination with the natural resources trustees such as NOAA. As stated earlier, close coordination with the New York State and New York City regulatory agencies is essential and should continue.

6. Develop and Refine a Conceptual Site Model that Considers Sediment Stability (Principle 4).

If the Region proposes a remedy that is expected to be the final action for the site, the CSTAG recommends development of a clearer conceptual site model (CSM) that evaluates all current and potential future exposure pathways. There is a substantial difference between the City's and the Region's estimates of the solids loading and contaminant sources to the canal from the CSOs. This can affect the CSM and should be resolved before proposing a final remedy for the site. Before a final

remedy is proposed, the CSTAG recommends that the following additional data be collected to improve the conceptual understanding of sediment and contaminant transport in the Gowanus Canal, and for quantifying the mass balance of sediments and contaminants at this site. These data are important for more accurately estimating, for example, the burial rate of contaminated sediments in the canal by clean sediments that are transported into the canal from the harbor during flood tides.

- Flux of suspended sediment and at least one contaminant of potential concern (COPC) across the downstream site boundary (DSB). This will require the measurement of the vertical velocity, suspended sediment, and COPC profiles at several stations along the DSB over complete semi-diurnal neap, mean, and spring tides. The COPC profiles should include measurement of both the particulate and dissolved phase concentrations.
- Flux of suspended sediment and at least one COPC across the downstream end of the flushing channel once it becomes operational. This will require the measurement of the velocity, and the suspended sediment and COPC concentrations over complete semi-diurnal neap, mean and spring tides. The COPC profiles should include measurement of both the particulate and dissolved phase concentrations. If the flushing channel is not influenced by tidal conditions, then this recommendation can be appropriately modified.
- Flux of suspended sediment and at least one COPC at several locations across the four largest CSOs. This will require the measurement of the velocity, the suspended sediment, and COPC concentrations over complete runoff hydrographs. The COPC profiles should include measurement of both the particulate and dissolved phase concentrations.
- Estimations of the groundwater flux of COPCs into the canal also are needed during both dry and a range of runoff producing events. Ensure that the variability in the sediment discharge is appropriately considered. This information may also useful if capping is selected as a component of the remedy.

7. Use an Iterative Approach in a Risk-Based Framework (Principle 5).

The CSTAG recommends that the Region consider an Interim ROD to remediate the NAPL sources near the three MGPs and a Final ROD (that may call for additional action, if needed) after the CSOs, ground-water, permitted and unpermitted discharges have been further controlled and their impacts on reducing risks are better understood.

8. Select Site-specific, Project-specific, and Sediment-specific Risk Management Approaches that will Achieve Risk-based Goals (Principle 7).

The Feasibility Study should consider whether bulkhead upgrades should be included in the remedy. CSTAG's understanding is that property owners will generally be responsible for upgrades, but there are properties where an owner has not been found or may not be able or willing to upgrade. The timing of bulkhead work is likely to be important relative to sediment remediation because bulkhead replacement activities are likely to release contaminants from behind the bulkhead into the canal.

The CSTAG recommends that the Region further evaluate the expected limited effectiveness of dredging based on the relatively large amount of debris in the canal and the fact that the deeper sediments are much more contaminated than the surface sediments. Alternatives that focus on capping

and minimize removal of sediments may be more effective based on the CSTAG's understanding of site conditions and contaminant profiles.

The CSTAG recommends that the Region consider developing and evaluating a range of remedial alternatives in the FS that include the following additional remedial alternatives:

- use of a low permeability, reactive capping material to control NAPL migration. Gas ebullition from under the cap that can facilitate NAPL transport through the cap can be addressed with vents and activated carbon to treat gas,
- temporarily draining the canal and redirecting the water flow to allow sediments to consolidate before placing a cap or dredging, this should include consideration of installing a passive french-drain style NAPL collection system under a cap as part of a capping alternative,
- Monitored Natural Recovery (MNR) as a remedial alternative for the lower reach,
- for areas where maintaining a minimum navigational water depth is not an issue, evaluate further if a cap can be placed without pre-dredging. Based upon experiences at other sites with soft sediment and low bearing strength, a cap can often be placed by using several thin lifts of sand allowing time for consolidation between placing lifts,
- retain one or more capping-only remedies that may use different in-situ amendments such as activated carbon or organo-clays within the cap,
- consider use of in-situ amendments to reduce bioavailability of surface contaminants for other areas of the site.

9. Ensure that Sediment Cleanup Levels are Clearly Tied to Risk Management Goals (Principle 8).

If the remedy proposed by the Region is intended to be a final action to reduce all contaminant-related risks to acceptable levels, additional work should be done to refine the Remedial Action Objectives (RAOs). The RAOs should be supported by quantifiable statements that specify the media and the contaminant cleanup levels to be achieved by the remedy in the short- and long-term, including interim targets that will impart some level of risk-reduction. In particular, the decision documents should specifically present the timeframes for the expected short-term and long-term reductions in concentrations of contaminants in sediments needed to ultimately attain the "acceptable levels" of risk described in the RAOs. If these RAOs are not expected to be reached, the Region should consider an interim ROD that is focused on source control.

The CSTAG recommends that the Region quantify risk reduction expectations for all remedies evaluated in the detailed analyses of alternatives in the FS. This would include estimates of the levels of recontamination that are expected to occur.

10. Maximize the Effectiveness of Institutional Controls and Recognize their Limitations (Principle 9).

The CSTAG expects that if an interim (or final) source control remedy that focuses on capping of the NAPLs is proposed, protective concentrations in fish are not likely to be achieved. Institutional controls to limit fish consumption and possibly direct exposures to the surface sediments may still be needed.

11. Monitor During and After Sediment Remediation to Assess and Document Remedy Effectiveness (Principle 11).

If the Region proposes a final action to reduce all risks to acceptable levels, the CSTAG recommends that the site database be evaluated for its adequacy to establish baseline conditions against which the RAOs and remedy effectiveness can be evaluated after the remedy has been implemented. Ideally, results from several sampling episodes over several years should be available.

Regional Response

Please provide a written response to these recommendations within 60 days. If you have any questions or would like a clarification of any recommendation, please call Steve Ells at 703 603-8822.

cc: Walter Mugdan, Region 2
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CSTAG Members